INCORPORATING SOIL MOISTURE MEASUREMENTS WITH PLANT GROWTH MONITORING Michele L. Reba USDA-ARS-Watershed Physical Processes Research Unit Jonesboro, AR Tina Grav Teague Erin J. Kelly University of Arkansas-Arkansas State University Jonesboro, AR

Abstract

Ninety percent of cotton in Arkansas is irrigated. Groundwater decline and current re-analysis of the state's water plan have increased concerns over water in the state. Irrigation management is a key component to sustainable agriculture. One strategy to improving irrigation management is the use of available field and plant data to quantify stress. Stress metrics from plant growth mapping and volumetric soil moisture sensors were calculated from a split plot designed irrigation experiment in northeastern Arkansas from 2010-2013. Irrigation treatments included irrigation at first square, first bloom and only from precipitation. Stress metric from plant growth mapping was based on a comparison to the target development curve for both slope and number of nodes. The cumulative stress metric for the season was strongly correlated to yield. Three day running mean of hourly averaged volumetric water content centered on the third day were calculated. The number of days below a threshold of 23% was summed for the four general stages of cotton growth and for the entire season and related to yield. The cumulative number of days below the threshold for the entire season was very strongly correlated to yield. Using the plant growth and soil moisture stress metrics in irrigation decisions is supported with this research.